HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Diru Creek Fall Chinook
Species or Hatchery Stock:	Summer/Fall Chinook, Voights Creek Stock
Agency/Operator:	Puyallup Tribe of Indians
Watershed and Region:	Puyallup River/ WRIA 10
Date Submitted:	
Date Last Updated:	August 13, 2002

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Diru Creek Fall Chinook

1.2) Species and population (or stock) under propagation, and ESA status.

Summer/Fall Chinook, *Oncorhynchus tshawytscha,* listed as threatened in March 1999

1.3) Responsible organization and individuals

Name (and title): Blake Smith, Enhancement Chief
Agency or Tribe: Puyallup Indian Tribe
Address:

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

Washington Department of Fish and Wildlife (WDFW), are responsible for the operation of the Voights Creek Hatchery where broodstock collection occurs.

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Funding sources:	Puyallup Tribe/BIA
Staffing level:	5
Annual hatchery program operational costs:	~$314,520

1.5) Location(s) of hatchery and associated facilities.

Diru Creek Hatchery – The Hatchery is located at River Mile 0.25 on Diru Creek (10.0029) a tributary to Clarks Creek (10.0027) in Puyallup, Washington. Clarks Creek is a Left bank tributary of the Puyallup River (10.0021) at River Mile 5.8.

Rushingwater Acclimation Pond – Pond is located at River Mile 0.5 on Rushingwater Creek (10.0625) that is a Left bank tributary at River Mile 1.1 on the Mowich River (10.0624).

Mowich River Acclimation Pond – Pond is located at River Mile 0.2 on the Mowich River

(10.0624).

Cowskull Creek Acclimation Pond – Pond is located at River Mile 0.1 on Cowskull Creek (10.0680) that is a Left bank tributary to the Puyallup River (10.0021) at River Mile 44.8.

1.6) Type of program.

Integrated Recovery/Integrated Harvest

1.7) Purpose (Goal) of program.

The Diru Creek Summer/Fall chinook program has a dual purpose. Half of the chinook program is aimed at integrated harvest for mitigation purposes. The other half of the program is aimed at integrated recovery for restoration purposes.

1.8) Justification for the program.

Fish for the integrated harvest program are released on-site at Diru Creek Hatchery. All chinook are 100% externally marked with an adipose clip at time of release. Furthermore, a release size of 50 fish/lb is the target goal that should minimize competition in the river and near shore Commencement Bay as determined by Puyallup Tribe beach seine data collected and summarized by Pacific International Engineering for the years 1980-1995.

Fish for the integrated recovery program are reared at Diru Creek Hatchery then imprinted and released out of the acclimation ponds located in the Upper Puyallup River above Electron Dam. All chinook are CWT and externally marked with an adipose clip at time of release. Adult chinook salmon have been blocked from migrating above Electron Dam for 95 years. This program is attempting to reestablish a viable chinook salmon run above Electron Dam in the 30 miles of usable salmonid habitat. Currently a fish ladder is being built on Electron Dam and should be completed by the fall of 2000.

1.9) List of program "Performance Standards".
See table in Section 1.10

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

Goal (Section 1.7-1.8)	**Performance Standard** (Section 1.9)	**Performance Indicator** (Section 1.10)
Abundance and Recovery Goals		
Diru Creek on-station releases provide adult returns that contribute to terminal fishery	Is there a viable terminal fishery?	Estimate total harvest in terminal fisheries
	Do the onsite releases contribute to the terminal fishery?	Estimate total contribution or contribution rate of program releases to fishery.
	Is the survival of onsite releases adequate to provide harvest contributions?	Estimate the survival (to fisheries and escapement) of onsite releases

Goal (Section 1.7-1.8)	**Performance Standard** (Section 1.9)	**Performance Indicator** (Section 1.10)
Acclimation pond releases result in increasing natural spawners above Electron dam.	How many spawners move above Electron Dam by origin?	Estimate total number of spawners on spawning grounds above dam
		Estimate contribution and contribution rate of acclimation pond releases to areas above dam
	Is the proportion of natural origin spawners above the dam increasing?	Estimate proportion of natural vs. hatchery origin spawners above the dam.
	Is the survival of acclimation pond releases adequate to provide spawners to area above dam?	Estimate the survival (to fisheries and escapement) of acclimation pond releases from time of release to pond.
Evaluation of domestication of hatchery releases		
Maintaining life history traits within range of natural origin chinook minimizes domestication of acclimation pond releases.	What are the life history parameters of the released and natural origin chinook?	Estimate length distribution, run timing and proportion of smolts by origin passing the Electron Dam.
		Estimate length distribution, run timing of smolts passing the main stem trap by origin
Evaluation of genetic hazards		
Minimize impact of hatchery origin chinook on natural spawners.	Do the hatchery origin spawners represent less than 5% of natural spawning population	Estimate contribution of hatchery origin fish to spawning grounds in Puyallup watershed.
Evaluate Predation and Competition of juveniles		
The hatchery releases do not represent an ecological hazard to natural origin juveniles; either through competition or predation.	What are the patterns of co-occurrence of hatchery and natural origin smolts in the system?	Estimate proportion of out migrating smolts past the Electron Dam and main stem traps that are of hatchery (acclimation pond and Voights Creek releases) origin by time period
		Record timing of release of onstation (Diru and Voights Creek) releases.

1.11) Expected size of program.

Expected size of program is 400,000 zero-aged smolts, of which 200,000 are destined for the Upper Puyallup River acclimation ponds.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

All broodstock are collected at the Voights Creek Hatchery operated by the Washington Department of Fish and Wildlife located on Voights Creek (10.0141) a Left bank tributary to the Carbon River (10.0413) at River Mile 4.0.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and

location.

Life Stage	Release Location	Annual Release Level
Fingerling	Diru Creek Hatchery	200,000
Fingerling	Acclimation Ponds	200,000

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Estimated smolt to adult survival information from PSMFC is given in the following table for fingerling releases at Diru Creek Hatchery:

Tagcode	BrYr	Date.Rel	Release Site	**% Survival**
211660	1984	05-Jun-85	10.0027	0.17
211730	1985	02-Jul-86	10.0027	0.01
212211	1986	24-Jun-87	10.0027	0.21
630307	1997	26-May-98	10.0029	N/A

Estimated smolt to adult survival information from PSMFC is given in the following table for fingerling releases at Upper Puyallup River acclimation ponds:

Tagcode	BrYr	Date.Rel	Release Site	**% Survival**
Blank Wire	1997	17-Jun-98	10.0624,10.0680	N/A
21-01-05	1998	08-Jun-99	10.0680,10.0624	N/A

Source:
http://www.rmis.org
or
http://www.nwifc.wa.gov/CRAS

Resulting adult escapement from fingerling releases from Diru Creek Hatchery are thought to spawn naturally in upper Clarks Creek (10.0027) River Mile 3.4 to 3.7. The following table is from spawning ground surveys conducted by Puyallup Tribal Fisheries:

Year	**Total Live**	**Total Dead**	**Total Redds**
1978/1979	0	1	NC
1979/1980	N/S	N/S	N/S
1980/1981	N/S	N/S	N/S
1981/1982	N/S	N/S	N/S
1982/1983	1	0	NC
1983/1984	N/S	N/S	N/S
1984/1985	445	489	NC
1985/1986	192	347	NC
1986/1987	N/S	N/S	N/S
1987/1988	47	49	12
1988/1989	N/S	N/S	N/S
1989/1990	N/S	N/S	N/S

1990/1991	N/S	N/S	N/S
1991/1992	43	13	NC

Clarks Creek Chinook Surveys Continued:

Year	Total Live	Total Dead	Total Redds
1992/1993	12	10	8
1993/1994	6	6	4
1994/1995	16	10	10
1995/1996	131	87	100
1996/1997	145	93	74
1997/1998	103	58	12
1998/1999	46	38	10

NS = Not Surveyed
NC = No Count

Adults counted by Puyallup Tribal Fisheries at the base of Electron Dam resulting from juvenile releases from the acclimation ponds:

Date	Species	Male	Female	Jacks
02-Sep-99	Chinook			1
13-Sep-99	Chinook			11

(Blake Smith pers. comm.)

1.13) Date program started (years in operation), or is expected to start.

The Diru Creek Hatchery program for chinook juveniles has been in operation since 1979.

The first acclimation pond releases for juvenile chinook in the Upper Puyallup River started on June 17, 1998 as part of a Resource Enhancement Agreement between Puget Sound Energy and Puyallup Tribe of Indians.

1.14) Expected duration of program.

The Upper Puyallup Acclimation Pond Program expects to operate until an interim escapement goal of 400 adult chinook are passed above Electron Dam 3 out of 4 years.

The Diru Creek on-station releases of chinook will continue indefinitely.

1.15) Watersheds targeted by program.

Acclimation chinook releases are targeting the Upper Puyallup River Watershed (River Mile 31 to 49) including The North (10.0699) and South Forks (10.0021) of the Puyallup River, Mowich River (10.0624), Meadow Creek (10.0630), Deer Creek (10.0685), and Rushingwater Creek (10.0625).

Diru Creek on-station releases are targeting the Lower Puyallup River (10.0021) from River Mile

5.7 and below. This is where the majority of our fishing effort occurs.

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

Currently no other actions are being considered to obtain program goals.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

Currently developing HGMP that will be used to develop 4(d) rule under ESA

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

Take actions for this program are difficult to quantify. Broodstock is not captured at Diru Creek Hatchery nor is the hatchery program engaged directly in smolt trapping.

White River Spring chinook (threatened) also exist in the Puyallup River basin. The level of take of this stock directly associated with the Diru Creek program is not available.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

Dendrogram: South Pairie population (Attachment 1, WDFW et al. 2000 *DRAFT*), Puyallup River Natural Spawning Escapements (Attachment 2, WDFW et al. 2000 *DRAFT*), Puyallup River Natural Fall Chinook Carcass Sampling Summary (Attachment 3, WDFW et al. 2000 *DRAFT*), Natural Puyallup River Fall Chinook- Fork Length (cm) by Age, 1992-1997 (Attachment 4, WDFW et al. 2000 *DRAFT*).

"In general, Puyallup River fall chinook enter the river from early June through October, with the peak migration in mid-to late August. Natural spawning begins in early September and is completed by early November, peaking in late September to early October. Typical of most Puget Sound summer/fall chinook stocks, Puyallup River fall chinook juveniles out-migrate as subyearlings. The majority of returning adults spawn as 4 yr-olds, with a lesser contribution of 3 year-olds. There are returns of 2 to 5 year-old spawners, but they form a very small portion of the spawning population." (WDFW et al. 2000 *DRAFT*).

- **Identify the ESA-listed population(s) that will be directly affected by the program.**

This program does not directly affect listed fish.

- **Identify the ESA-listed population(s) that may be <u>incidentally</u> affected by the program.**

Puget Sound Chinook, threatened:

A naturally spawning population of fall chinook exists primarily within South Pairie Creek, however, the extent of genetic similarity between hatchery stock and South Pairie Creek natural-spawners needs further examination. GSI samples have been collected within the two groups but analysis is pending fund availability.

White River Spring Chinook: Hatchery and wild-origin fish are both listed populations, the extent of interaction between Diru Creek fall chinook is unknown.

Bull trout (threatened)- Adult bull trout are thought to spawn from late August to mid-October. Bull trout have been observed spawning in Silver Spring and Camp Creek, both tributaries to the White River (Puyallup River tributary). Redd superimposition has been brought up as a possible concern due to temporal overlap during spawning (Gene Stagner pers. comm. USFWS (360) 753-9440)

2.2.2) <u>Status of ESA-listed salmonid population(s) affected by the program.</u>

- **Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds**

Puyallup River natural escapement estimates suggests increasing abundance of fall chinook in the Puyallup Basin over the last ten years, Attachment 2. (WDFW et al. 2000 *DRAFT*)

- **Provide the most recent 12-year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

Data not available

- **Provide the most recent 12-year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.**

Puyallup River Natural Spawning Escapements, Attachment 2.

- **Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

Data not currently available. Carcass sampling on the spawning ground has occurred but fall chinook from this program have not been externally marked and/or CWT for every brood year of

production. Production starting with broodyear 1999 will be mass marked for evaluating this question.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Broodstock collection directed at fall chinook salmon has a potential to take listed fall chinook salmon through migrational delay, capture, handling, and upstream release, during trap operation at Voights Creek Hatchery between July 15th through February 15th. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation.

- **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

Puget Sound chinook, listed March 1999. Voights Creek broodstocking efforts could include take of listed fish in the fall of 1999 and thereafter. Beginning with brood year 1999 all origin hatchery fish will be visually marked with adipose clip. Beginning in 2002, 3 year-old returns will be able to be partitioned by origin.

- **Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

Not applicable. Broodstock not collected at Diru Creek, smolt trapping will occur in the lower Puyallup River at RM 10.5, but is not directly associated with the operation of the Diru Creek Hatchery program.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

Not applicable

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted

policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

Currently, the Puget Sound ESU-wide hatchery plan is being developed.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

The Puget Sound Salmon Management Plan (PSSMP 1985) sets out the legal framework under which comanagement of hatchery programs occurs.

The Puyallup Tribe entered into a Resource Enhancement Agreement (REA) with Puget Sound Energy (PSE) in 1997. Through the agreement, funds are allocated to begin fish restoration efforts. The Puyallup Tribe is currently in the design process to construct a fish ladder at the dam. The fish ladder project aims to be operational by the fall of 2000.

The agreement also stipulates minimum in-stream flow requirements for migrating adults in the Electron Dam project area (WDFW et al. 2000 *DRAFT*).

3.3) Relationship to harvest objectives.

"The co-managers agree harvest management should be biased toward maximum harvest of hatchery origin fall chinook, while naturally produced fall chinook should be harvested at a rate that is consistent with maintaining or improving natural stock productivity. To accomplish this the co-managers will consider fishery opportunities and gear types that accommodate differential harvest rates on the hatchery and natural fall chinook stocks." (WDFW et al. 2000 *DRAFT*)

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

"Limited tag recovery information indicates that Puyallup River hatchery fall chinook historically contributed to most Washington and southern B.C. mixed stock chinook fisheries, the Puget Sound recreational fishery and the Puget Sound terminal net fisheries." (WDFW et al. 2000 *DRAFT*)

See Attachment 5 & 6. For historical recreational and tribal catches respectively.

See Attachment 7 for CWT recoveries in specific fisheries.

For summary of Predicted Puyallup River Fall Chinook Exploitation Rates by Aggregated Fisheries see Attachment 8.

3.4) Relationship to habitat protection and recovery strategies.

A number of anthropogenic factors have affected fish habitat throughout the Puyallup Basin.

Beginning in the late 1800's timber production began resulting in bank instability problems and increased sediment loads entering the river. Habitat has also been affected by flood control activities, including the removal of riparian vegetation and large woody debris, and levee construction. Remedies are currently under way to mitigate some of the past land management practices. Land acquisitions for the construction of set-back levies is one such practice. The increase in sinuosity created by the use the set-back levies should aid in gravel and woody debris recruitment processes, providing more suitable habitat for spawning adults and refugia for rearing and outmigrating juveniles.

The lower Puyallup River, below its confluence with the White River, and Commencement Bay estuary have both been heavily impacted by residential and commercial development. Commencement Bay has been heavily influenced by industrial uses. In 1982, the federal government ranked the Commencement Bay among the most hazardous waste sites in the U.S. Restoration efforts are currently underway which are managed by the Natural Resource Damage Trustees. The trustees include NOAA, USFWS, DOE, DNR, WDFW, and the Puyallup and Muckleshoot Indian Tribes. (WDFW et al. 2000 *DRAFT*).

The upper Puyallup Basin has been void of anadromous fish production since the construction of the Electron Dam in 1903. Under the Resource Enhancement Agreement the Puyallup Tribe and Puget Sound Energy are working together to design and construct a fish ladder to create a bypass to this fish barrier.

3.5) Ecological interactions.

Adult bull trout are thought to spawn from late August to mid-October. Bull trout have been observed spawning in Silver Spring and Camp Creek, both tributaries to the White River (Puyallup River tributary). Redd superimposition has been brought up as a possible concern due to temporal overlap during spawning (Gene Stagner pers. comm. USFWS (360) 753-9440)

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

On-station water is supplied from two wells supplying 800 gpm (combined). An additional 200 gpm is available as surface water gravity fed from Diru Creek (WDFW et al. 2000 *DRAFT*). The acclimation ponds use gravity fed surface water from the adjacent rivers. Further descriptions are in section 9.2.3.

The Mowich site receives an average flow of 1,300 gpm, the Rushingwater site is supplied with an average flow of 896 gpm, and the Cowskull pond receives an average flow of 896 gpm.

Department of Ecology permit for water withdrawal is G2-25820.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for

the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

There are no listed natural fish in Diru Creek.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock for this program are collected at WDFW Voight's Creek Hatchery (See WDFW Voight's Creek HGMP).

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Fish transportation equipment consists of three 600-gallon capacity tanks. Each is supplied with supplemental oxygen and aeration.

5.3) Broodstock holding and spawning facilities.

See WDFW Voight's Creek HGMP.

5.4) Incubation facilities.

Diru Creek receives eggs or fry from WDFW Voight's Creek Hatchery. Incubation facilities include 20 vertical stacks of 12 trays. Approximately 5 stacks are used for the fall chinook program.

Rearing facilities.

Initial rearing uses 16 shallow troughs in the hatchery building. Additional rearing containers include four 50'x 5' x 5' raceways, two 6696 cubic foot ponds (UP1 and UP2), and one 13,000 cubic foot pond (LP) that is also used for holding returning chum adults.

5.5) Acclimation/release facilities.

The Diru Creek Program typically receives 400k progeny received from WDFW Voight's Creek's egg take. Half, approximately 200k, are released from acclimation sites above Electron Dam and the remaining fish are released on-station at Diru Creek.

5.6) Describe operational difficulties or disasters that led to significant fish mortality.

A December 1996 ice storm knocked down trees crushing our hatchery supply line, which temporarily interrupted water flows to the incubator stacks, resulting in alevin mortality. It took two hours to repair the line. The alevin stage is where oxygen demand is at its peak in the incubators. Of the 1.0 million eggs received, 395,000 smolts were released for a 39.1% survival rate (see table in section 9.2).

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Hatchery has a low-water alarm installed, linked via pager to hatchery staff. Also installed on-site is a back-up diesel powered generator capable of supplying a 170 kW in the event of an electrical failure.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Refer to WDFW Voight's Creek HGMP for Section 6 information. No broodstock is collected on-station.

Different stocks have been supplied to Diru Creek Hatchery from WDFW Voight's Creek Hatchery; however, within the past ten years only the Diru Creek stock has been released from the Diru Creek Hatchery (See Attachment 9, Voight's Creek on-station by stock).

6.2) Supporting information.

6.2.1) History.
6.2.2) Annual size.
6.2.3) Past and proposed level of natural fish in broodstock.
6.2.4) Genetic or ecological differences.
6.2.5) Reasons for choosing.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

SECTION 7. BROODSTOCK COLLECTION

Broodstock are collected at WDFW Voight's Creek Hatchery, (See WDFW Voight's Creek HGMP). The average annual adult escapement to Voights Creek from 1995 through 1998 was 2983 chinook salmon (range 2030 to 3484, Puyallup River Fall Chinook Recovery Plan).

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

7.2) Collection or sampling design.

7.3) Identity.

Voight's Creek Stock

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

The average annual broodstock collection goal at Voights Creek Hatchery under the present program is 1110 adult fall chinook (550 male and 550 female, WDFW Voights Creek HGMP).

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

7.6) Fish transportation and holding methods.

7.7) Describe fish health maintenance and sanitation procedures applied.

7.8) Disposition of carcasses.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

Not applicable, matings occur at WDFW Voight's Creek Hatchery. See WDFW Voight's Creek Hatchery Fall Chinook HGMP for Section 8 information.

8.1) Selection method.

8.2) Males.

8.3) Fertilization.

8.4) Cryopreserved gametes.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Eggs or fry are received from WDFW Voight's Creek Hatchery; the number received is contingent upon having enough fish to meet program goal of having 200,000 fingerlings for both the acclimation pond and on-station fingerling releases. Survival data on hatchery fish is available and is calculated from stage received at facility through time of release (See section 9.2).

9.1.2) Cause for, and disposition of surplus egg takes.

No excess eggs available

9.1.3) Loading densities applied during incubation.

7,000 eggs per Heath tray

9.1.4) Incubation conditions.

Eggs are reared on well water at constant 50 degrees Fahrenheit. D.O. measurements in the incubator stacks are approximately 12 ppm. Of the 11 stacks available at the hatchery 5 are used for incubating fall chinook.

9.1.5) Ponding.

Fish are ponded when approximately 95% of the fish are buttoned up.

9.1.6) Fish health maintenance and monitoring.

Formalin is used as an anti-fungal agent for eggs. It is injected into the water supply line for each stack at a concentration of 1:600 (or 1,667 ppm formalin) for 15 minutes every other day.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Not applicable, hatchery stock is not listed.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-

99), or for years dependable data are available.

Survival data on hatchery fish is available and is calculated from stage received at facility through time of release. Fish are received at eyed egg and fry stage.

Brood Year	% Survival	Stage Received
1990	95.5	Eyed eggs
1991	96.7	Eyed eggs
1992	*	Eyed eggs
1993	60.2	Eyed eggs
1994	94.5	Eyed eggs
1995	60.2	Eyed eggs
1996	39.1	Eyed eggs
1997	75.5	Eyed eggs
1998	*	Fry

*= Unable to calculate percent survival for brood years 1992 and 1998 due to an estimation error by WDFW on the number of eggs received. Both years there were more fish released than eggs/fry received.
(Blake Smith pers. comm.)

9.2.2) Density and loading criteria (goals and actual levels).

Rearing densities dependent on fish size
500-1000 fpp .5 lb/ft^3, 2 lbs/gpm (maximum threshold)

50-500 fpp .5 lb/ft^3, 6 lbs/gpm (maximum threshold)

9.2.3) Fish rearing conditions

Description of acclimation ponds

Unit	Cubic Feet	Flow *	Exchange/HR
Mowich	14,000	1300 gpm	.62
Cow Skull	10,000	896 gpm	.72
Rushingwater	14,000	896 gpm	

*= Average flow
Acclimation pond temperatures range from 39-54 F
DO approximately12 ppm

Diru Creek Hatchery
Temperatures range from 50-52 F
DO approximately12 ppm

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during

rearing, if available.

See Attachment 10.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Data not available

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Diru Creek Hatchery
Fry fed Biostarter once per hour, 8 hours a day, 5 days a week
Fingerlings on site fed Biodry 1000 reduced frequency every two hours, 8 hours a day, 5 days a week.

Acclimation ponds
Feeding is achieved by automatic AF3A Sweeny scatter feeders with 6 separate feeding intervals between 1 to 2 percent body weight per day of Biodry 1000 based on temperature and size of fish.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Each year, fish pathologists screen a representative number of adults returning to tribal hatcheries for pathogens that may be transmitted to the progeny. The exact number of fish to be tested from each stock is specified in the Co-managers' Salmonid Disease Control Policy. Pathologists work with hatchery crews to help avoid pre-spawning mortality of broodfish to maximize fertilization and egg survival.

Preventative care is also promoted through routine juvenile fish health monitoring. Pathologists conduct fish health exams at each of the tribal hatcheries on a monthly basis from the time juveniles' swim-up until they are released as smolts. Monthly monitoring exams include an evaluation of rearing conditions as well as lethal sampling of small numbers of juvenile fish to assess the health status of the population and to detect pathogens of concern. Results are reported to hatchery managers along with any recommendations for improving or maintaining fish health. Vaccine produced by the TFHP may be used when appropriate to prevent the onset of two bacterial diseases (vibriosis or enteric redmouth disease). In the event of disease epizootics or elevated mortality in a stock, fish pathologists are available to diagnose problems and provide treatment recommendations. Pathologists work with hatchery crews to ensure the proper use of drugs and chemicals for treatment. The entire health history for each hatchery stock is maintained in a relational database called AquaDoc. (Northwest Indian Fisheries Commission Fish Pathology pers.comm.)

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Not applicable

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Both acclimation ponds have natural rock bottoms with root wads placed in the ponds.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Fish will be reared to sub-yearling smolt size to mimic the natural fish emigration strategy and are released volitionally.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Fingerling	200,000	40-60 fpp	Late April-Early May	On-station
Fingerling	200,000	60-80 fpp	Late May-Early June	Acclimation

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:
Release point:
Major watershed:
Basin or Region:

See Attachment 11.

10.3) Actual numbers and sizes of fish released by age class through the program.

See Attachment 11.
http://www.nwifc.wa.gov/CRAS.asp

10.4) Actual dates of release and description of release protocols.

Diru Creek Hatchery releases are forced released. Acclimation pond fish are released volitionally.

See Attachment 11. for specific release date ranges.

10.5) Fish transportation procedures, if applicable.

Fish are transported to the acclimation ponds via oxygen supplemented tanker truck. Container volumes for each of the three tanks is 600 gallons. The transit time to the acclimation sites is about 1 hour.

10.6) Acclimation procedures.

Fish are transported in late March to acclimation sites and are acclimated for approximately 5 weeks prior to release.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Fish for restoration purposes are 100% CWT and adipose fin clipped prior to release into acclimation ponds, and fish for mitigation purposes of brood year 1999 and beyond will be 100% adipose marked prior to release at Diru Creek Hatchery.

Prior to the 1999 brood, fish were not mass-marked. Past CWT releases did receive an adipose clip.

Tag code	Brood year	Total release	No. CWT	Shed	No. marked	Untagged	% Marked
211660	1984	301,180	29,388	2,730	32,118	269,062	11.94%
211730	1985	162,044	34,537	813	35,350	126,694	27.90%
212211	1986	335,010	33,782	5,363	39,145	295,865	13.23%

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Not applicable

10.9) Fish health certification procedures applied pre-release.

Monthly fish health monitoring exams, as described in section **9.2.7**, are conducted by a fish pathologist from the Northwest Indian Fisheries Commission up until the time of release. Fish are usually examined within 2 weeks of their scheduled release. The exam includes an assessment of mortality rate, fish behavior, general condition of the fish, and rearing conditions. A necropsy is performed on representative fish from the population, including moribund and dead fish if these are available. An attempt is made to determine factors contributing to mortality. Parasites are routinely screened for by microscopic examination of gills and skin scrapes. Bacterial or viral assays may be conducted at the discretion of the pathologist if there is evidence of an infectious disease problem. Depending upon the findings of the exam, a

recommendation will be made to either release the fish as planned, or if necessary, to take appropriate management actions prior to release.

10.10) Emergency release procedures in response to flooding or water system failure.

In the event of catastrophic water failure fish would be released early.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Data not found

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

Monitoring and evaluation plan is currently being developed.

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Performance Indicator	Sampling Locations	Sample Items	Assumptions and Comments
Harvest Goals			
Estimate total harvest in terminal fisheries	Terminal Fishery	Fish Tickets	All harvest recorded on tickets
Estimate total contribution or contribution rate of program releases to fishery.	Terminal Fishery	Landed harvest sampled for CWTs and fin clips	Diru Creek onsite and acclimation pond releases have been tagged and clipped
Estimate the survival (to fisheries and escapement) of onsite releases	Pre-terminal and terminal fisheries, hatcheries and natural spawning areas	Harvest and escapement sampled for CWTs and adipose fin clips	Diru Creek onsite releases have been tagged (50%)and clipped (100%). All fisheries and escapement locations are sampled
Abundance Recovery Goals			
Estimate total number of spawners on spawning grounds above dam	Spawning areas above dam	Surveys provide data for escapement estimates	Unbiased escapement estimates

Performance Indicator	Sampling Locations	Sample Items	Assumptions and Comments
Estimate contribution and contribution rate of acclimation pond releases to areas above dam	Spawning fish in areas above dam and at trap in dam sampled by Puyallup Indian Tribe	All fish at dam sampled for adipose fin clips and tags detected. All fish sampled above dam sampled for CWTs and adipose fin clips	Samples taken in areas above dam provide estimate of origin of spawners (Diru Creek onsite and acclimation pond and Voights Creek releases, and natural origin)
Estimate proportion of natural vs. hatchery origin spawners above the dam.	Spawning fish in areas above dam and at trap in dam sampled by Puyallup Indian Tribe	All fish at dam sampled for adipose fin clips and tags detected. All fish sampled above dam sampled for CWTs and adipose fin clips	Samples taken in areas above dam provide estimate of origin of spawners (Diru Creek onsite and acclimation pond and Voights Creek releases, and natural origin)
Estimate the survival (to fisheries and escapement) of acclimation pond releases from time of release to pond.	Preterminal and terminal fisheries, hatcheries and natural spawning areas	Harvest and escapement sampled for CWTs and adipose fin clips	Diru Creek acclimation pond releases have been 100% tagged and clipped. All fisheries and escapement locations are sampled
Evaluation of domestication of hatchery releases			
Estimate length distribution, run timing and proportion of smolts by origin (natural vs. acclimation pond release) passing the Electron Dam.	Flume at Electron Dam	Lengths, time of migration clip status and CWTs	Assume that there is no relationship between the probability of exiting through the flume and the origin, the size distribution or run timing.
Estimate length distribution, run timing of smolts passing the main stem trap by origin	Smolt trap in main stem above confluence with White River	Lengths, time of migration clip status and CWTs	
Evaluation of genetic hazards (Domestication)			
Estimate contribution rate of hatchery origin fish to spawning grounds in Puyallup watershed.	Spawning ground surveys. The PIT surveys entire Puyallup system except So. Prairie Creek which is surveyed by WDFW and Huckleberry creek (White River) which is surveyed by MIT.	CWTs, adipose fin clips.	CWT 100k of on station releases and adipose fin clip all of the release. CWT 200k (all) of acclimation pond releases. Voights Creek chinook releases are adipose fin clipped as a mass-mark.
Predation and Competition of juveniles			
Estimate proportion of outmigrating smolts past the Electron Dam and mainstem traps that are of hatchery (acclimation pond and Voights Creek releases) origin by time period	Flume at Electron Dam and smolt trap in mainstem	CWTs, adipose fin clips	Assume that there is no relationship between the probability of exiting through the flume and the origin, the size distribution or runtiming. CWT 100k of on station releases and adipose fin

Performance Indicator	Sampling Locations	Sample Items	Assumptions and Comments
			clip all of the release. CWT 200k (all) of acclimation pond releases. Voights Creek chinook releases are adipose fin clipped as a mass-mark.
Record timing of release of on station (Diru and Voights Creek) releases.	Hatcheries (Diru Creek and Voights Creek)	Time of release	

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

SECTION 12. RESEARCH

Currently no funded research is occurring.

12.1) Objective or purpose.

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12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

SECTION 13. ATTACHMENTS AND CITATIONS

Northwest Power Planning Council (NPPC). 1999. Artificial Production Review. 851 S.W. Sixth Avenue, Suite 1100, Portland Oregon 9720-1348.

Pacific International Engineering. 1996. PuyallupTribe Beach Seine Data 1980-1995. Pacific International Egineering, 151 S. Worthen St, Suite 101, Wenatchee, WA 98801.

Puget Sound Salmon Management Plan. 1985. United States vs. Washington 1606 F. Supp. 1405.

Washington Department of Fish and Wildlife, Muckleshoot Tribe of Indians, and the Puyallup Tribe of Indians. 2000. Draft of The Puyallup River Fall Chinook Recovery Plan. Contact: Chuck Baranski, WDFW Fish Program Region 6.

Smith, Blake. 1999. Diru Creek Hatchery Facility Description. Puyallup Tribe of Indians, 6824 Pioneer Way E., Puyallup, WA 98371.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: _____	**ESU/Population:_____**		**Activity:_____**
Location of hatchery activity:_____	**Dates of activity:_____**		**Hatchery program operator:_____**
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***		
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*